

WHAT IS CLAIMED IS:

1. An intraductal fluid withdrawal system, comprising:  
a control unit;  
a patient interface unit;  
a control line extending between the control unit and the patient interface unit;  
and  
a closed fluid circulation loop, having a first component removably carried by the control unit and a second component carried by the patient interface unit.
2. An intraductal fluid withdrawal system as in Claim 1, wherein the first component comprises a reservoir.
3. An intraductal fluid withdrawal system as in Claim 2, wherein the circulation loop comprises a movable wall.
4. An intraductal fluid withdrawal system as in Claim 3, wherein the circulation loop comprises a compressible tube.
5. An intraductal fluid withdrawal system as in Claim 1, wherein the second component comprises an inflatable bladder.
6. An intraductal fluid withdrawal system as in Claim 5, wherein the bladder comprises at least 3 inflatable lobes.
7. An intraductal fluid withdrawal system as in Claim 6, comprising at least 6 inflatable lobes.
8. An intraductal fluid withdrawal system as in Claim 1, further comprising a heat exchange fluid contained within the closed loop.
9. An intraductal fluid withdrawal system as in Claim 6, wherein each lobe has an inflated width of no more than about 3 inches and an inflated length of no more than about 4 inches.
10. An intraductal fluid withdrawal system as in Claim 9, wherein each lobe has an inflated width of no more than about 2 inches and an inflated length of no more than about 3 inches.
11. An intraductal fluid withdrawal system as in Claim 6, wherein each lobe has an inflated thickness of no more than about 1 inch.

12. An intraductal fluid withdrawal system as in Claim 11, wherein each lobe has an inflated thickness of no more than about 0.5 inches.

13. An intraductal fluid withdrawal system as in Claim 1, further comprising a heat source in the control unit.

14. An intraductal fluid withdrawal system as in Claim 13, wherein the first component is removably in thermal communication with the heat source.

15. An intraductal fluid withdrawal system as in Claim 1, further comprising a pump in the control unit.

16. An intraductal fluid withdrawal system as in Claim 15, wherein the fluid circulation loop is positioned such that the pump causes fluid circulation through the loop.

17. An intraductal fluid withdrawal system as in Claim 1, further comprising a support in the patient interface unit, for supporting the second component in compressive contact with the patient.

18. An intraductal fluid withdrawal system as in Claim 17, wherein the support is adjustable.

19. An intraductal fluid withdrawal system as in Claim 1, further comprising a disposable patient interface carried by the patient interface unit, for contacting the patient.

20. An intraductal fluid withdrawal system as in Claim 1, wherein the disposable patient interface comprises a flexible polymeric membrane.

21. An intraductal fluid sampling system, comprising:

a control unit;

a patient interface unit;

a control line extending between the control unit and the patient interface unit;

and

a flow path, extending along the control line and providing communication between a first component carried by the control unit and a second component carried by the patient interface unit.

22. An intraductal fluid sampling system as in Claim 21, wherein the flow path comprises a closed circulation loop.

23. An intraductal fluid sampling system as in Claim 21, wherein the first component comprises a reservoir.

24. An intraductal fluid sampling system as in Claim 23, wherein the reservoir is removably carried by the control unit.

25. An intraductal fluid sampling system as in Claim 23, wherein the flow path comprises a movable wall.

26. An intraductal fluid sampling system as in Claim 23, wherein the reservoir comprises a compressible container.

27. An intraductal fluid sampling system as in Claim 21, wherein the second component comprises at least one inflatable bladder.

28. An intraductal fluid sampling system as in Claim 27, comprising at least 4 inflatable bladders.

29. An intraductal fluid sampling system as in Claim 28, comprising at least 6 inflatable bladders.

30. An intraductal fluid sampling system as in Claim 22, further comprising a heat exchange media contained within the closed loop.

31. An intraductal fluid sampling system as in Claim 28, wherein each bladder has an inflated width of no more than about 3 inches and an inflated length of no more than about 4 inches.

32. An intraductal fluid sampling system as in Claim 31, wherein each bladder has an inflated width of no more than about 2 inches and an inflated length of no more than about 3 inches.

33. An intraductal fluid sampling system as in Claim 27, wherein each bladder has an inflated thickness of no more than about 1 inch.

34. An intraductal fluid sampling system as in Claim 33, wherein each bladder has an inflated thickness of no more than about 0.75 inches.

35. An intraductal fluid sampling system as in Claim 21, further comprising a heat source in the control unit.

36. An intraductal fluid sampling system as in Claim 35, wherein the heat source is removably in thermal communication with the first component.

37. An intraductal fluid sampling system as in Claim 36, further comprising a pump in the control unit.

38. An intraductal fluid sampling system as in Claim 37, wherein the flow path is positioned such that the pump applies compressive force to the flow path.

39. An intraductal fluid sampling system as in Claim 21, further comprising a support in the patient interface unit, for supporting the second component in compressive contact with the patient.

40. An intraductal fluid sampling system as in Claim 39, wherein the support is adjustable.

41. An intraductal fluid sampling system as in Claim 21, further comprising a disposable patient interface carried by the patient interface unit, for contacting the patient.

42. An intraductal fluid sampling system as in Claim 21, wherein the disposable patient interface comprises a flexible polymeric membrane.

43. An intraductal fluid sampling system as in Claim 42, wherein the disposable patient interface further comprises a rigid support for maintaining patency under vacuum, attached to the flexible polymeric membrane.